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EXAMINER	
MARTIN, LAURA E	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/827,030	TORGERSON ET AL.	
	Examiner	Art Unit	
	Laura E. Martin	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 5/7/07.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-50,56 and 57 is/are pending in the application.

4a) Of the above claim(s) 3,5,32,34-42 and 45-50 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,4,6-31,33,43,44,56 and 57 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 6-9, 21-24, 26, 43, 44, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maze et al. (US 20010008411) in view of Bhaskar et al. (US 5808640).

Maze et al. disclose the following claim limitations:

As per claim 1: a substrate (figure 3, element 313); a first fluid feed slot formed in the substrate (figure 3, slot at end of opening 307 furthest away from nozzle) and having a first fluid feed slot edge; first firing resistors disposed along the first fluid feed slot and configured to respond to a first current to heat the fluid provided by the first fluid feed slot via a fluid path (figure 3, element 309) and [0032]; a reference conductor formed on the substrate and configured to conduct the first current from the first firing resistors [0032].

As per claim 2: the reference conductor is disposed between at least two of the firing resistors (figures 3 and 5 – reference conductor has a resistor on one side of it, it would have been obvious to have a resistor on the other side of it, as the nozzles are laid out side by side).

As per claim 4: firing resistor areas disposed along a first fluid feed slot, wherein the reference conductor is disposed between at least two adjacent firing areas (figures 3 and 5 – reference conductor has a resistor on one side of it, it would have been obvious to have a resistor on the other side of it, as the nozzles are laid out side by side).

As per claim 6: drive switches, wherein each drive switch is electrically connected to a corresponding first firing resistor of the first firing resistors and the reference conductor [0030-0032] and (figure 4, elements 401 and 403).

As per claim 7: drive switches, wherein each drive switch is a field effect transistor that is electrically connected between a corresponding first firing resistor and the reference conductor (figure 4, element 403) and [0029-0032].

As per claim 21: vaporization chambers (figure 3. element 301) fluidically coupled to the first fluid feed slot; and an isolation layer configured to isolate the reference conductor from the fluid flowing from the fluid feed slot to the vaporization chambers, wherein the reference conductor is disposed between the vaporization chambers and the first feed slot edge (figure 9, element 907)

As per claim 22: a substrate (figure 3, element 113); a first fluid feed slot formed in the substrate (figure 3, slot at end of opening 307 furthest away from nozzle) and having a first fluid feed slot edge; first vaporization chambers fluidically coupled to the

first fluid feed slot via a fluid feed path (figure 3, element 301); a reference conductor formed on the substrate and disposed under the fluid path in an area between the first vaporization chambers and the first fluid feed slot edge [0032] and (figures 3, 5, and 9); and an isolation structure configured to isolate the reference conductor from fluid flowing over the first fluid feed slot edge to the first vaporization chambers (figure 9, element 907).

As per claim 23: the reference conductor is disposed between at least two of the vaporization chambers (figures 3 and 5 – reference conductor has a resistor on one side of it, it would have been obvious to have a resistor on the other side of it, as the nozzles are laid out side by side).

As per claim 24: the reference conductor is disposed along to opposing sides of the first fluid feed slot (figure 9, element 503/505).

As per claim 26: each of the fluid paths is fluidically coupled to the first fluid feed slot and an corresponding one of the first vaporization chambers (figure 3) and the reference conductor is isolated from the fluid flowing through the fluid paths by the isolation structure (figure 9, element 907).

As per claim 43: receiving fluid via a fluid path at first firing resistors (figure 3, element 309) disposed along a first fluid feed slot formed in the substrate (figure 3, element 313), the first fluid feed slot having a first fluid feed slot edge (figure 3, slot at end of opening 307 furthest away from nozzle) and the fluid path extending between the first fluid feed slot edge and the first firing resistors (figure 3, element 307), receiving a first current at the first firing resistors; heating the fluid received from the first fluid feed

slot in response to receiving the first current at the first firing resistors [0032]; receiving the first current from the first firing resistors at a reference conductor (figure 5, elements 503/505) formed on the substrate under the fluid path in an area between the first fluid feed slot edge and the first firing resistor (figure 9); and conducting a first part of the current through the reference conductor as disposed between the first fluid feed slot and the first firing resistors [0032].

As per claim 44: first firing resistor areas (figure 3); conducting a second part of the current through the reference conductor as disposed between the first firing resistor areas [0032].

As per claim 56: a substrate (figure 3, element 313); a first fluid feed slot formed on the substrate (figure 3, slot at end of opening 307 furthest away from nozzle); first vaporization chambers fluidically coupled to the first fluid feed slot via a fluid path (figure 3, element 301); and a reference conductor disposed under the fluid path in an area between the edge of a first fluid feed slot and first vaporization chambers (figures 3 and 5).

As per claim 57: an isolation structure configured to isolate the reference conductor from fluid flowing through the fluid path (figure 9, element 907).

Maze et al. do not disclose the following claim limitations:

As per claims 1, 22, 43, and 56: conductors disposed under a fluid path in an area between a first fluid feed slot edge and a first firing resistors or first vaporization chambers.

As per claim 8: the reference conductor is disposed along the entire length of the fluid feed slot.

As per claim 9: the reference conductor is disposed along opposing sides of the first fluid feed slot and along the entire length of the opposing sides of the first fluid feed slot.

Bhaskar et al. disclose the following claim limitations:

As per claims 1, 22, 43, and 56: a reference conductor (figure 1, element 22) disposed under a fluid path (figure 1, element 16) in an area between a first fluid feed slot edge (figure 1, element 28) and a first firing resistors (figure 1, element 20) or first vaporization chambers (figure 1, element 18).

As per claim 8: the reference conductor is disposed along the entire length of the fluid feed slot (figure 5, elements 64, 66, 68, and 70).

As per claim 9: the reference conductor is disposed along opposing sides of the first fluid feed slot and along the entire length of the opposing sides of the first fluid feed slot (figure 5, elements 64, 66, 68, and 70).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the fluid ejection device taught by Maze et al. with the disclosure of Bhaskar et al. in order to provide a higher quality ink ejection device and to allow for a complete and simple firing cycle.

Claims 1, 22, 43, and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Meyer (US 20020109755) in view of Bhaskar et al. (US 5808640).

Meyer discloses the following claim limitations:

As per claim 1: a substrate (figure 1, element 12); a first fluid feed slot formed in the substrate (figure 1, element 16) and having a first fluid feed slot edge; first firing resistors disposed along the first fluid feed slot and configured to respond to a first current to heat the fluid provided by the first fluid feed slot via a fluid path (figure 2, element 38) and [0024]; a reference conductor formed on the substrate and configured to conduct the first current from the first firing resistors, wherein the reference conductor is disposed under the fluid path in an area between the first fluid feed slot edge and the first firing resistors (figure 1, element 40) and [0024].

As per claim 22: a substrate (figure 1, element 12); a first fluid feed slot formed in the substrate (figure 1, element 16) and having a first fluid feed slot edge; first vaporization chambers fluidically coupled to the first fluid feed slot via a fluid feed path (figure 1, element 30); a reference conductor formed on the substrate and disposed under the fluid path in an area between the first vaporization chambers and the first fluid feed slot edge [0024]; and an isolation structure configured to isolate the reference conductor from fluid flowing over the first fluid feed slot edge to the first vaporization chambers (figure 1, element 40).

As per claim 43: receiving fluid via a fluid path at first firing resistors (figure 2, element 38) disposed along a first fluid feed slot formed in the substrate (figure 1, element 12), the first fluid feed slot having a first fluid feed slot edge (figure 1, element 16) and the fluid path extending between the first fluid feed slot edge and the first firing resistors (figure 2, element 38), receiving a first current at the first firing resistors;

heating the fluid received from the first fluid feed slot in response to receiving the first current at the first firing resistors [0024]; receiving the first current from the first firing resistors at a reference conductor (figure 1, elements 40) formed on the substrate under the fluid path in an area between the first fluid feed slot edge and the first firing resistor (figure 2, element 8); and conducting a first part of the current through the reference conductor as disposed between the first fluid feed slot and the first firing resistors [0024].

As per claim 56: a substrate (figure 3, element 313); a first fluid feed slot formed on the substrate (figure 1, element 16); first vaporization chambers fluidically coupled to the first fluid feed slot via a fluid paths (figure 1, element 14 and 24); and a reference conductor disposed under the fluid path in an area between the edge of a first fluid feed slot and first vaporization chambers (figure 1, element 40).

Meyer does not disclose the following claim limitations:

As per claims 1, 22, 43, and 56: conductors disposed under a fluid path in an area between a first fluid feed slot edge and a first firing resistors or first vaporization chambers.

Bhaskar et al. disclose the following claim limitations:

As per claims 1, 22, 43, and 56: a reference conductor (figure 1, element 22) disposed under a fluid path (figure 1, element 16) in an area between a first fluid feed slot edge (figure 1, element 28) and a first firing resistors (figure 1, element 20) or first vaporization chambers (figure 1, element 18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the fluid ejection device of Meyer with the disclosure of Bhaskar et al. in order to allow for a complete and simple firing cycle.

Claims 10-19, 25, 27-31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maze et al. (US 20010008411) and Bhaskar et al. (US 5808640), and further in view of Cleland et al. (US 6491377).

Maze et al. disclose the following claim limitations:

As per claims 10-19, the reference conductor (figure 5, element 505/503) being configured to conduct current [0032] to a resistor (figure 5, element 501), wherein the reference conductor is disposed between the first fluid feed source edge (and the firing resistors (figures 3, 5, and 9).

As per claims 25 and 29: a reference conductor (figure 5, element 503/505) disposed between a fluid vaporization chambers and the first fluid feed source (figures 3 and 5).

As per claim 26: the reference conductor is isolated from fluid flowing through the fluid paths by the isolation structure (figure 9, element 907)

As per claim 27: the second vaporization chambers and the second fluid feed source edge and the isolation structure is configured to isolate the reference conductor from fluid flowing over the second fluid feed source edge to the second vaporization

chambers (multiple cartridges (figure 1, element 111) mean multiple vaporization chambers, figure 9, element 907).

As per claim 28: the reference conductor is (figure 5, element 503/505) disposed between at least two of the second vaporization chambers (figures 3, 5, and 9).

As per claim 31: drive switches, wherein each of the drive switches is electrically coupled between a corresponding one of the firing resistors and the reference conductor (figure 4, elements 401/403) and [0030-0032].

Maze et al. as modified do not disclose:

As per claim 10, the first firing resistors are disposed along opposing sides of the first fluid feed source.

As per claim 11, second firing resistors disposed along the first fluid feed source and configured to respond to a second current to heat fluid provided by the first fluid feed source.

As per claim 12 the second firing resistors are disposed on opposing sides of the first fluid feed source.

As per claim 13, a second fluid feed source and third firing resistors disposed along the second fluid feed source and configured to respond to a third current to heat fluid provided by the second fluid feed source.

As per claim 14, the third firing resistors are disposed on opposing sides of the second fluid feed source and a third fluid feed source edge along another one of the opposing sides of the second fluid feed source.

As per claim 15, fourth firing resistors disposed along the second fluid feed source and configured to respond to a fourth current to heat fluid provided by the second fluid feed source.

As per claim 16, the fourth firing resistors are disposed on opposing sides of the second fluid feed source.

As per claim 17, fifth firing resistors, wherein a first portion of the fifth firing resistors are disposed along the first fluid feed source and configured to respond to a fifth current to heat fluid provided by the first fluid feed source and a second portion of the fifth firing resistors are disposed along the second fluid feed source and configured to respond to the fifth current to heat fluid provided by the second fluid feed source.

As per claim 18, sixth firing resistors, wherein a first portion of the sixth firing resistors are disposed along the first fluid feed source and configured to respond to a sixth current to heat fluid provided by the first fluid feed source and a second portion of the sixth firing resistors are disposed along the second fluid feed source and configured to respond to the sixth current to heat fluid provided by the second fluid feed source.

As per claim 19, a second fluid feed source having a second fluid feed source edge in communication with the substrate surface and second firing resistors, wherein a first portion of the second firing resistors are disposed along the first fluid feed source and configured to respond to a second current to heat fluid provided by the first fluid feed source and a second portion of the second firing resistors are disposed along the second fluid feed source and configured to respond to the second current to heat fluid provided by the second fluid feed source.

As per claim 25, the first vaporization chambers are disposed along opposing sides of the first fluid feed source and the reference conductor is disposed between the first vaporization chambers and the first fluid feed source edge along one of the opposing sides of the first fluid feed source and the first vaporization chambers and a second fluid feed source edge along another one of the opposing sides of the first fluid feed source.

As per claim 26, fluid paths, wherein each of the fluid paths is fluidically coupled to the first fluid feed source and a corresponding one of the first vaporization chambers and the reference conductor is isolated from fluid flowing through the fluid paths by the isolation structure.

As per claim 27, a second fluid feed source having a second fluid feed source edge; and second vaporization chambers fluidically coupled to the second fluid feed source.

As per claim 28, the reference conductor is disposed between at least two of the second vaporization chambers.

As per claim 29, the second vaporization chambers are disposed along opposing sides of the second fluid feed source and the reference conductor.

As per claim 30, firing resistors, wherein each of the firing resistors is disposed in a corresponding one of the first vaporization chambers and configured to respond to a current to heat fluid provided by the first fluid feed source and the reference conductor is configured to conduct the current from the firing resistors.

Cleland et al. disclose the following claim limitations:

As per claim 10, the first firing resistors are disposed along opposing sides of the first fluid feed source (figure 13A, element 9-10 MAGENTA) and the reference conductor (figure 11C, element 1111) is disposed between the first firing resistors and the first fluid feed source edge along one of the opposing sides of the first fluid feed source and the first firing resistors and a second fluid feed source edge along another one of the opposing sides of the first fluid feed source.

As per claim 11, second firing resistors disposed along the first fluid feed source and configured to respond to a second current to heat fluid (column 15, line 64-column 16, line 23) provided by the first fluid feed source (figure 13A, elements 13-14, MAGENTA).

As per claim 12 the second firing resistors are disposed on opposing sides (figure 13A, element 13-14) of the first fluid feed source.

As per claim 13, a second fluid feed source and third firing resistors disposed along the second fluid feed source (figure 13A, element CYAN 17-20) and configured to respond to a third current to heat fluid (column 15, line 64-column 16, line 23) provided by the second fluid feed source.

As per claim 14, the third firing resistors are disposed on opposing sides of the second fluid feed source (figure 13A, element CYAN 17-20).

As per claim 15, fourth firing resistors disposed along the second fluid feed source (figure 13A, element 21-24 CYAN) and configured to respond to a fourth current

to heat fluid provided by the second fluid feed source (column 15, line 64-column 16, line 23.

As per claim 16, the fourth firing resistors are disposed on opposing sides of the second fluid feed source (figure 13A, element CYAN).

As per claim 17, fifth firing resistors, wherein a first portion of the fifth firing resistors are disposed along the first fluid feed source (figure 13A, MAGENTA 15 and 16) and configured to respond to a fifth current to heat fluid provided by the first fluid feed source (column 15, line 64-column 16, line 23) and a second portion of the fifth firing resistors are disposed along the second fluid feed source and configured to respond to the fifth current to heat fluid provided by the second fluid feed source (column 15, line 64-column 16, line 23).

As per claim 18, sixth firing resistors, wherein a first portion of the sixth firing resistors are disposed along the first fluid feed source (figure 13A, element MAGENTA 9-10)and configured to respond to a sixth current to heat fluid provided by the first fluid feed source (column 15, line 64-column 16, line 23) and a second portion of the sixth firing resistors are disposed along the second fluid feed source and configured to respond to the sixth current to heat fluid provided by the second fluid feed source (column 15, line 64-column 16, line 23).

As per claim 19, a second fluid feed source having a second fluid feed source edge (figure 13A, element CYAN) in communication with the substrate surface (figure 13A, 1300) and second firing resistors (figure 13A, element 13-16), wherein a first portion of the second firing resistors are disposed along the first fluid feed source and

configured to respond to a second current to heat fluid provided by the first fluid feed source and a second portion of the second firing resistors are disposed along the second fluid feed source and configured to respond to the second current to heat fluid provided by the second fluid feed source (column 15, line 64-column 16, line 23.

As per claim 25, the first vaporization chambers (column 1, line 61-column 2, line 5) are disposed along opposing sides of the first fluid feed source (figure 13A, CYAN, 9-12) and the reference conductor (figure 11A, element 1111) is disposed between the first vaporization chambers and the first fluid feed source edge along one of the opposing sides of the first fluid feed source and the first vaporization chambers and a second fluid feed source edge along another one of the opposing sides of the first fluid feed source.

As per claim 26, fluid paths, wherein each of the fluid paths is fluidically coupled to the first fluid feed source and a corresponding one of the first vaporization chambers (column 12, lines 54-62)

As per claim 27, a second fluid feed source having a second fluid feed source edge; and second vaporization chambers fluidically coupled to the second fluid feed source (figure 13A, element MAGENTA, 9-16)

As per claim 29, the second vaporization chambers are disposed along opposing sides of the second fluid feed source (figure 13A, elements MAGENTA 17-20) and the reference conductor (figure 11A, element 1111).

As per claim 30, firing resistors, wherein each of the firing resistors is disposed in a corresponding one of the first vaporization chambers (column 1, line 61-column 2, line 5) and configured to respond to a current to heat fluid provided by the first fluid feed source and the reference conductor is configured to conduct the current from the firing resistors (column 15, line 64-column 16, line 23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the fluid ejection device of Maze et al. as modified with the disclosure of Cleland et al. in order to create a higher quality printer.

Claim 20 isrejected under 35 U.S.C. 103(a) as being unpatentable over Maze et al. (US 20010008411) and Bhaskar et al. (US 5808640), and further in view of Chen et al. (US 20020135640).

Maze et al. disclose the following claim limitations:

The device of claim 1.

Maze et al. as modified do not disclose the following claim limitations:

The reference conductor comprises a conductive layer and a resistive layer.

Chen et al. do not disclose the following claim limitations:

The reference conductor comprises a conductive layer and a resistive layer [0024].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the fluid ejection device of Maze et al. as modified with the disclosure of Chen et al. in order to create a higher quality printer.

Response to Arguments

Applicant's arguments with respect to claims 1-50, 56, and 57 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Martin whose telephone number is (571) 272-2160. The examiner can normally be reached on Monday - Friday, 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Laura E. Martin

5/16/07

MANISH S. SHAH
PRIMARY EXAMINER